ART. XVII.—*Malaria and Malarial Diseases.* By GEORGE M. STERNBERG, M.D., F.R.M.S., Major and Surgeon U. S. Army; Member of the Biological Society of Washington; late Member of the Havana Yellow Fever Commission of the National Board of Health; Corresponding Member of the Epidemiological Society of London, etc. 8vo., pp. 329. New York: William Wood & Co., 1884.

THIS volume, announced last year, was published some time during the summer. It was looked for with much interest by practical physicians both in civil and military circles, and proves to be, as was expected, a work of considerable interest and value. Coming to us fresh from the hands of its distinguished author, it arouses an interest that some of the volumes of the series to which it belongs have failed to excite. The subject is one in which Dr. Sternberg is known to have long been deeply interested, and while, as we learn from the preface and the text, he fully recognizes that the unsolved problems connected with it are not likely to be settled by the pen, its preparation has afforded him a favorable opportunity to review the literature of the subject, and to compare the recorded experience of recent foreign authors, whose works have not been republished in this country, with that of physicians in the malarious sections of the United States. Graceful acknowledgment to the authors from whose experience he has drawn, is made in the preface, and precise bibliographical references are subscribed at the foot of almost every page. In truth, every page bears testimony to the discriminating industry with which the author has searched the older and the recent writings upon the subject. But the evidence of his own extensive practical knowledge is no less ample, and that which he has to say is interwoven with that which he has quoted from the writings of others, with a deftness that does credit alike to his scientific acumen and his literary skill.

The word malaria is not used in its etymological sense as a general term to include all kinds of bad air, or even all forms of disease-producing bad air. It is used in the much more restrictive sense, as denoting "a special kind of poison, not necessarily aëriform, which produces certain well-defined morbid phenomena, namely, the periodic fevers." This test of malaria, the author strongly insists upon—that it is known by its effect in causing the periodic fevers. It is certainly true that an intermittent or remittent pyrexia cannot be taken by itself as evidence of malarial poisoning; not even the curative power of the cinchona alkaloids can be accepted as an absolute test; nevertheless, there is no difficulty in recognizing typical intermittent fever, in which a well-marked paroxysm occurs daily or every second day; and the prevalence of this form of fever, at least during certain seasons of the year, must be accepted as the test of the presence of malaria, in any particular region.

Dr. Sternberg strongly inclines to the opinion, which we hold with him, that the kind of malaria under consideration does not produce other forms of fever, and especially continued forms, not curable by quinine. The truth of this opinion is a matter of very serious importance to general medical knowledge, and a failure to recognize it has been the cause of endless confusion of thought, vagueness of teaching, vitiation of statistics, and mistaken medication. It is open to question whether an ephemeral fever (febricula) is ever an intermittent of a single paroxysm—a fever due to malaria. Such ephemeral fevers occur in non-malarious regions from a variety of causes. In malarious districts it is, however, the fashion to attribute every case of ephemeral fever to malaria.

The author questions the propriety of ascribing the continued fevers of warm latitudes, known as *acclimating fevers*, to malaria. He seeks also to establish, and with success we believe, that neither so-called continued remittent fever, nor the idio-malarial fever of Edward Miller, nor Naples fever, nor Roman fever, nor Malta fever, nor Rock fever, nor mountain fever, nor other not truly periodical local fevers, which have commonly been attributed to malaria, are in fact due to that cause. Some of them are clearly due to the poison which causes enteric fever, others to causes not yet well worked out, but malarious, in the sense in which Dr. Sternberg used that term, they certainly are not. He also emphasizes the fact that the endemic continued fevers of the United States, which are often wrongly attributed to malaria, are in reality, in many instances, atypical or imperfectly developed forms of enteric fever.

With reference to "typho-malarial" fever, Dr. Sternberg is not satisfied (we think the expression might be stronger) that intermediate forms exist between periodic and enteric fevers.

Part I. treats of malaria.

Malaria is defined as "an unknown poison, of telluric origin, the cause of the periodic fevers." The mode of infection or of intoxication is briefly, but clearly discussed. The author is unwilling to concede, at the outset, that in the cause of the periodic fevers we have to deal with a living germ capable of reproducing itself outside the body, and that those diseases fall under the head of the "miasmatic infectious" diseases of Leibermeister. He prefers to regard the manner of the action of the cause, whether by "infection" or by "intoxication," as unsettled.

The chapter on "Speculations and Researches relating to the Nature of Malaria," is written in a truly scientific spirit. The older authorities concurred in confessing ignorance of the definite chemical and physical characters of malaria. The author regrets that he does not find himself in a position to give a more definite answer to the question, What is malaria? He regards it, however, as right to review the researches thus far made, and the speculations that have led to them, in order to indicate the direction which future investigations should take.

Until recently the opinion commonly held was that of Lancisi, namely, that the malarial poison was of a gaseous or aëriform nature. Of late, however, there has been a growing disposition to believe that it is particulate and organized; in other words, a living "germ" or micro-organism. This view is not new. It was formulated by Lucretius (95 B. C.). The author has overlooked the following passage in the writings of M. Terentius Varro, a contemporary of Lucretius (116–27 B. C.), which likewise formulates this view with singular distinctness: "*Si qua erunt loca palustria crescunt animalia quædam minuta, quæ non possunt oculi consequi, et per aëra intus in corpus per os et nares perveniunt atque efficiunt difficiles morbos.*"

In modern times Linnæus (1778) and J. K. Mitchell (1859) gave prominence to this theory of the causation of the periodic fevers. It is hardly worth while to combat the view that malarial fevers are produced by gases well known to chemists, the toxic properties of which are quite different from those exhibited by the unknown agent malaria. But with reference to the suggestion that malaria may be some complex nitrogenous substance present in the air of marshes and other malarious localities, some outcome of the vital activity of micro-organisms, the pabulum for the rapid multiplication of which may exist in the organic matter of malarial soils,—with regard to this suggestion the author cannot speak with the same confidence. In *sepsin*, the ptomaines and the proteids obtained by Weir Mitchell and Reichert from serpent venom, we have examples of such substances capable of producing the most violent toxic effects in very small doses. The theory of Bence-Jones of the mode of infection and pathogenic action, based upon the supposition that malaria is a poison of this kind, is not accepted, its weak point being that "during the remission probably the poison is reproduced until sufficient is formed, in from one to three days, to go through the same action again."

Dr. Sternberg suggests two other explanations :—

> "First. Malarial poisoning may be an intoxication in which the toxic agent is not reproduced within the body, and in which the paroxysmal febrile attacks are secondary phenomena, resulting remotely from injury to the nervous system, caused by the direct action of the poison, and immediately from a secondary cause, such as chill, indigestion, vitiated secretion, etc."
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> "Second. The poison may be reproduced within the body by the same micro-organisms which are concerned in its production in the soil, and which may gain entrance to the body by the respiration of atmospheres in which they are suspended, or by the ingestion of malarious waters."

Still another hypothesis is that malarial poisoning results from infection by low organisms, present in a malarious atmosphere, which *directly* produce the phenomena ascribed to malaria, but which do not multiply within the body of the infected individual.

Finally, the malarial poison is supposed by many to be *a living germ, capable of self-multiplication within the body* of an infected individual, as well as in the malarious soils, which are its normal habitat. According to this view, the morbid phenomena are accounted for by the direct action of the malarial parasite, and the periodicity which characterizes malarial fevers is supposed to result from circumstances relating to the life-cycle and periodic development of this micro-organism.

Dr. Sternberg considers the observations and experimental researches bearing upon the two last-named hypotheses with great carefulness and fairness. He then seeks to estimate their value.

The researches of Salisbury (1866), Bolestra (1870), Lanzi (1876), Eklund (1878), Klebs and Tommasi-Crudeli (1879), the author's experiments bearing upon the work of the last-named observers, conducted under the auspices of the National Board of Health, the labors of Marchiafava, Cuboni, Peroncito, Ceri, and others, finally the results of the investigations of Laveran (1881) and Richard (1882), in France, are described and critically examined. The difficulties attending such investigations are indicated ; the extreme liability of making pseudo discoveries, and the consequent importance of special scientific training and of a truly conservative spirit on the part of the investigator, are pointed out and urged upon the attention of the reader.

The circumstances relating to the production of malaria give very strong support to the belief that the poison which is produced in the soil—in the presence of organic matter, ground-water and ground-air, and under the influence of an elevated temperature—is a living organism or a chemical product evolved during the active growth of such an organism. This being admitted, the following possibilities present themselves for consideration :—

(*a*) Malarial poisoning may be an *intoxication* resulting from the respiration of an atmosphere containing a toxic agent produced by living organisms in the soil.

(*b*) It may be an *infection* resulting from the respiration of an atmosphere charged with malarial germs, born in the soil, which enter the circulation and multiply in the blood, or in special organs, and produce *directly* the morbid phenomena which characterize malarial diseases.

(*c*) Malarial intoxication may result from infection by malarial germs, born in the soil, which multiply within the body of the infected individual, and thus produce a toxic chemical agent to which the morbid phenomena are due.

In this case it is not necessary to suppose that the malarial parasite invades the blood. It may remain in the alimentary canal, where it would find abundant pabulum in the food ingested, and where the poisonous products would during the active growth find ready access, by absorption, to the circulating fluid.

The second (*b*) of these hypotheses, that urged by Tommasi-Crudeli, and the believers in the *Bacillus malariæ*, is that which has of late received the greatest consideration ; but it seems to the author to have less in its favor than either of the others. He regards the third (*c*) with the greatest favor, and points out that it is especially worthy of the attention of future investigators.

This part of the book is written in a spirit of judicial impartiality, too rare in current medical literature. Aside from its value as a summary and criticism of conflicting views upon an obscure subject of the most general and absorbing interest, it is admirable as a model of the manner in which the facts bearing upon unsettled scientific inquiries should be presented in literary review, and as such we venture to urge it upon the attention of investigators, both in the laboratory and at the bedside. The facts upon which an hypothesis is based should be sifted with the mind of the judge, rather than colored by the fancy of an advocate, before they are adduced as evidence. Certainly they should be able to stand close scrutiny as to their veritableness, relevancy, and common interdependence.

The general effects of malaria are next considered, and then the antidotes to malarial poisoning and prophylaxis. The chapter on general distribution is a reproduction of Creighton's translation of the account of the subject in Hirsch's Handbook of Geographical and Historical Pathology, the author regarding any attempt to improve upon the work of Hirsch as useless.

Part II. treats of Malarial Diseases.

Under the heading Malarial Intermittent Fevers, ague and its varieties are considered. The latter comprises masked intermittents, pernicious intermittent, algid pernicious intermittent, and comatose pernicious intermittent (congestive fever).

Under the heading Continued Malarial Fevers are considered simple remittent fever, ardent malarial fever, adynamic remittent fever, pernicious remittent fever, and complicated remittent fever. The latter variety comprises those cases of all the other types which are modified in important particulars by cerebral, enteric, or gastric complications.

The final chapter is devoted to the subject of hemorrhagic malarial fever, which might properly be included under the heading complicated malarial fever. But, inasmuch as the nature of the complication is not definitely known, and as the term hemorrhagic simply expresses a clinical fact, but does not commit us to any theory as to the course of the hæmaturia, there can be no objection to the designation, which does not apply with equal force to the other clinical varieties of malarial fever, that have been separately described, *e. g.*, pernicious intermittent and remittent fever, ardent malarial fever, etc.

The second part of the work is ably written, sufficiently full and explicit for the reference of the practitioner, and up to date. It is largely and confessedly a compilation, and therefore lacks much of the impress of the author's individuality, which constitutes the charm of the first part. In pointing out this fact we are not unmindful that judicious compilation is an art that is alike necessary and productive of the most useful results.

Dr. Sternberg's work is an exceedingly well-timed, satisfactory, and useful book. J. C. W.

ART. XVIII.—*Clinical and Pathological Observations on Tumors of the Ovary, Fallopian Tube, and Broad Ligament.* By ALBAN H. G. DORAN, F.R.C.S., Assistant Surgeon to the Samaritan Free Hospital, formerly Anatomical and Pathological Assistant to the Museum of the Royal College of Surgeons of England. With thirty-two illustrations. 8vo., pp. 189. London, 1884.

ANY book from the pen of a member of the staff of the Samaritan Free Hospital is sure to present something of interest and worthy of consideration. Anticipation is not lessened when the title-page bears the name of a gentleman well known from frequent contributions to journals and numerous valuable papers in the transactions of societies, on the pathology of ovarian and pelvic tumors. This, his first contribution to standard literature, is of the scientific and practical character to be expected from the position he occupies and the rich field of observation at his command. The material upon which it is based is derived from six hundred and five abdominal sections, at which he has been present as operator or assistant, from November, 1877, to March, 1884. Of these, three hundred and sixty-six were operations for the removal of multilocular ovarian tumors.

The two aspects of the book are by no means so well balanced in the body as on the title-page, the pathological far preponderating over the clinical. For obvious reasons this is to be regretted, without disparaging the one or unduly estimating the other. The book would certainly be more generally useful and interesting had it been more closely directed to the practical aspects of the subject. As presented it is not a systematic treatise, either pathological or clinical, but an assemblage of chapters on various subjects not necessarily connected with each other, in which cases are referred to and some points of them noted, without being detailed, and in which a few practical points are so well presented that the reader cannot but wish that they had been all given. It is a book, then, for the practitioner rather than the student; indeed, it is not at all adapted for the latter, but will be perused with interest and profit in direct ratio to the amount of practical knowledge of the subject the reader already possesses. It may seem unfair not to allow an author his own choice as to manner of presentation, but it seems clear that precisely because the work has been prepared for practitioners will it occasion great disappointment to find the most important practical points of the subject, some of them